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Attitudes of PhD Holders towards the Business Sector in Hungary[1]

Abstract

One of the main strategic aims, formulated in the current EU and national science policy documents regarding Hungary, is to invigorate the collaboration between the academic and the business enterprise sector. As a base for such a collaboration this study aims to analyze the attitudes of PhD holders towards the business sector and expose the differences between STEM and SSH researchers regarding their career–path strategies. Although the examination has recognized a positive shift in the beliefs and attitudes of STEM researchers in the last ten years, their intensions and behavior are to stand aside the business sector more than SSH researchers. The study attempts to enlighten the structural background of this phenomenon and identify some of its consequences based on an ongoing career-path research project.

1 Introduction

Effective elements of the R&D structure have long existed in Hungary but their operation was not sufficiently harmonized during the years after the post-socialist transition. Besides the institutional dividedness, science policy documents neither fitted to the desirable extent, nor were their aims clearly visible for the different actors of the system.

In the actual science policy documents there are clear aims: one of the most dominant goals nowadays for Hungary is the intense collaboration between the academic and business sectors (National Research Development and Innovation Strategy 2013-2020). In order to reach the goal of accelerating cooperation it is necessary to have an adequate workforce which is highly qualified and open to work for enterprises.

The aim of this article is to provide empirical results regarding some dimensions of the attitudes of PhD holders towards the business sector as an important factor of such

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collaborations. Moreover, the paper aims to give additional concerns by providing a deeper understanding of the background in the career decisions of PhD holders.

2 Theoretical background

The findings of this study are based on a longitudinal research project at the Hungarian Academy of Sciences (HAS) which follows the career path of scholars at the research institutions and evaluates the grants that are provided to them.

The recent study focuses only on the *organisational* dimension of their careers (Glaser, J., Laudel G. 2015) as well as the beliefs and attitudes towards different organizational sectors and positions they could meet. As the project is an applied research project with a special focus on the organisational aspect of the career-path, it has severe theoretical limitations in the case of attitudes.

The literature about attitudes presents a great diversity of descriptions for the term and the methods for the measures. The definition of attitudes used in this concept is the one given by Fishbein and Ajzen (1975) as most investigators would agree that it is: *"a learned predisposition to respond in a consistently favourable or unfavourable manner with respect to a given object"* (Fishbein-Ajzen 1975: 10). They emphasize the distinction between *attitude* and other phenomena of the attitude area reserving *affect* as the most essential part of attitude. Other categories they point out are: *"cognition (beliefs, opinions), conations (behavioral intentions), and behavior (observed over acts)"* (Fishbein-Ajzen 1975:12).

During the different stages of the research project important information on the *beliefs, attitudes, intentions* and *behaviour* of scholars is gained. However, these results are not sufficient for a comprehensive and systematic attitude research. Despite this, the results are relevant and they do implicate important concerns about the mentioned science policy issue.

3 Methodology

In the basic phase of the examination qualitative research was conducted among young researchers with PhD, widening the focus gradually, and finally detailed questionnaires were used. The research phases that have been carried out until now are the following:

- Career Path Research among Young PhD holders in Biology, a complex research with 11 semi-structured interviews, 2 narrative life story interviews, 2 focus groups and a small science field–specific survey (N=102);
- Career Path Research of Scholars with STEM (biology, chemistry physics, medicine) and SSH (sociology, political science, history, literature, linguistics) PhD in Hungary, with 30 semi-structured interviews, maximum age 40 years.

- Career Path Monitor among research group leaders and members funded by the Lendület (Momentum) Programme of the Hungarian Academy of Sciences (assorted STEM and SSH fields, max. age 45 years); online survey (N=190).

Most findings in this article are based on the qualitative data from the early, explorative research phases. *Beliefs, attitudes* and *intentions* (Fishbein-Ajzen 1975.) towards the business sector had directly been examined in the very first phase with in-depth interviews and narrative life story interviews through the narratives of the interviewees. Later on in the research, organisational career-path (Glaser, J., Laudel G. 2015) types were identified among scholars from different scientific fields based on their actual labour market behaviour (career sequences) as unravelled from the semi structured interviews. Finally, the researchers' *intensions* and actual labour market *behaviour* were tested in special labour market situations with questionnaires.

The results presented in the paper are relevant and new regarding attitudes of PhD holders towards the business sector. Thus they are suitable for developing directions and hypotheses for further systematic researches.

4 Structural Frames

4.1 Research Policy Organisations

In 1989, the democratic change in Hungary was slowly followed by the restructuring of different aspects of the polity and the society. As part of this process the former Soviet type of science organisations was replaced with a new structure based on the EU countries' standards and the elements of the previous national system.

In 1993, the PhD was introduced replacing the former soviet type doctoral degree, the candidature. Universities regained the right to offer PhD programs and award PhD degree from the Scientific Qualification Committee, a semi-political body at the Hungarian Academy of Sciences during socialism.

Since the democratic transition the R&D structure has been changing continuously, but not only in connection with the structural change but because of the different governments. The changes of the organisations have been so intense that neither the researchers nor the organisations themselves could develop well, and the system has been unpredictable for both.

The Hungarian R&D structure had effective institutions after the post-soviet transformation but these were not harmonised enough. Instead of having a focused and strong representation in the policy making processes and its organisational structure, R&D function was dispersed in three ministries: The Ministry for National Economy, the Ministry of National Development, and the Ministry of Human Capacities.

The National Research Development and Innovation Office has just been developed by the former president of the Hungarian Academy of Sciences at the Prime Minister's Office. It may centralise the dispersed R&D deputy. The governmental R&D background organisations at the ministries are focusing mostly on STEM research as the key to the economic growth, while paying less attention to SSH research.

4.2 Characteristics of the Research and Science Policy

Policy making processes and science and research policy documents were overly diversified, partly due to the mentioned organisational status. There was a lack of unified terminology and well defined aims in the field of research and science policy making – because of the variety of different purposes and the variety of documents, aims were dispersed. The implementation of the written goals was very weak and inconsequent.

Since 2011 the importance of reinforcing the research community with young scientist has become better recognised (Report to the Hungarian National Assembly on the Activities of the HAS and on the General Situation of Hungarian Science, 2013). The current science policy documents regarding Hungary show less, but clearer directions. One of the most recognizable aims is to accelerate the collaboration between the academic and the business sectors (National Research Development and Innovation Strategy 2013-2020; Csite et al 2013) and to increase the number of highly qualified labor force (e.g. the number of researchers). A comprehensive policy analysis (Csite et al 2013) found the following particular aims in common in the present EU and the national science policy documents:

- Providing sufficient R&D human resource supply
- Increasing the number of high quality, qualified workforce according to the needs of enterprises
- Increasing the number of graduates with entrepreneurial skills
- Fitting basic research to the regional innovation strategies
- Enhancing the role of the higher education institutions in the regional economies
- Developing knowledge triangles, strategic partnerships with companies, and dual education
- Intensifying technology-transfer, and the foundation of enterprises
- Improving access to the R&D infrastructure for enterprises

Source: Csite et al 2013: 42

4.3 Research Institutions

The governmental, higher education and business enterprise sector are all active in the Hungarian R&D sector, but NGOs are not visible. The governmental research sphere almost entirely consists of the research organisations of the Hungarian Academy of Sciences. This is the most respectful platform of sciences in Hungary which has various research groups in all scientific fields. In higher education, researcher universities operate many research units in all scientific fields, too. The number of the higher educational research units has continuously been shrinking in the last decade. Moreover, the number of the state-run research units, after a long stagnation in 2012, decreased drastically in connection with the reorganisation of the HAS institutions. Thus, by 2012 in Hungary the corporate sector operates the greatest number of research units (1,583), something which has never happened before (KSH 2014).

4.4 Researchers

In 2014, 37,329 people were employed as researchers in different research organisations in Hungary. In 2012, the number of the FTE researchers per 1000 inhabitants in Hungary was 6,1 which is lower than the EU27 average of 7,6 (EUROSTAT 2012).After the democratic transformation, the number of researcher positions drastically decreased, mostly in industry. Around 1996, the correction began and has been continuous (KSH 2014). In 2006, the number of full time equivalent business enterprise researchers overtook both the number of academic and higher education researchers (KSH 2014).

The trend of the last decade is that the traditionally relatively high number of academic, governmental and higher educational researchers is stagnating while the number of researchers in the business sector is growing. According to this, the ratio for the number of business enterprise researchers is at a very good level in a regional comparison, however, those who own a PhD degree are underrepresented in the business enterprise sector (EUROSTAT 2009). On the contrary their ratio in the government sector is very high in an international comparison – thanks to the traditionally strong academy in Hungary, the survivor of the former soviet-type science system.

4.5 Important Features of Academic Positions

The institution of tenure is common in Hungary, but the promotion had been incalculable for years after the transition, and it is still limited for young scholars. In Hungary, there is a linear relationship between seniority and pay in the public servant salary system for academic positions. Performance differences have just appeared sporadically between younger and older scholars. Academic researchers are paid below the average compared to the researchers of the business sector in Hungary, and are paid far below the average of the international (e.g. EU15) wage.

4.6 R&D and the Business Enterprise Sector

Getting closer to the companies, in Hungary mostly large enterprises can play a role in R&D. However, even these companies hardly keep their R&D departments in the country. Only these enterprises are able to lobby for optimal developmental environment, too. Most of the SMEs are fighting for survival, yet without effective, direct subventions these have a slight chance to connect to R&D processes. Hungary can have some confidence from those start-ups in informatics which turned into successes in the global market as well as the JEREMIE Programme which proved to be more successful in Hungary than in other countries of the region.

What is narrowing the R&D developmental possibilities of the enterprises and their cooperation with academic sector is their reluctance towards venture capital. In addition, it is difficult to find investors for the early stages, mostly for the seed capital that is substantial for such collaborations. Nevertheless, creative scientific work requires an innovative environment, and the ratio of innovative enterprises in Hungary is very low in a regional comparison (KSH 2014).

5 Findings

5.1 Beliefs Forming Stereotypes

The first phase of the longitudinal career-path research project was conducted in one narrow scientific field: among young postdoctoral researchers in biology in 2007. As the very first step of the project, it focused on the PhD as a new phenomenon in the R&D system in Hungary. It was an explorative in-depth analysis based on qualitative methods: classical and narrative life story interviews, focus groups and a small sample questionnaire survey.

Surprisingly, the young biologists showed extremely weak interest in the business enterprise sector and their *attitudes*, and *beliefs* formed strong and commonly shared negative stereotypes, saying that business enterprise jobs are ‘monotonous’, ‘dull’, and ‘boring’, ‘not requiring any creativity’. This proved to be very important as ‘creativity’ and ‘exciting work’ with ‘autonomy’ were the most important and very positive principles they attributed to their academic researcher jobs. Their stereotype of the academic statuses contained mixed and squarely negative attributes, too: ’sincerity’, ‘be under cover’, ‘a man of his cast’, and ‘deprivation’.

The negative attitudes towards the business sector jobs may partly arise from the traditional intellectual role’s interpretation according to the common values of higher education (Palló 2009), the tiny amount of information on researcher positions in the business sector, and their unfamiliarity for the respondents. The positive attitudes towards the

academic statuses may partly relate to the same intellectual role's interpretation, and the positive experiences: they really enjoy their tasks as researchers and find it is a very important feature of their job. The negative ones are owing to the structural background: firstly, the characteristics of the public servant salary system, which is unfavourable for those at the beginning of their career, and does not differentiate by performance.

The strong negative stereotypes changed to some extent in 2012 among STEM researchers by attributing the same creative and exciting character to some start-up positions in the business sector. This change should be important in the later cooperation with the business enterprise sector. Let us see now what the typical career path patterns and strategies of the researchers at the academy are. Are they ready to cooperate or change?

5.2 Career-path Strategies of PhD Holders

The analysis of the qualitative data identified three dimensions of the job satisfaction which can play substantial roles in forming the career paths of PhD holders. The dimensions of satisfaction proved to determine the career-decisions of the examined scholars are:

Tasks (Creativity, and meaningfulness)

Working environment (Motivation, inspiring colleagues and satisfying infrastructure)

Wage (Being able to live on without problems)

A highly qualified, motivated labour force tries to keep these three dimensions at a consistently high level. The first dimension did not seem to be problematic in case of academics in Hungary: nearly all respondents like their tasks, they feel that their job is meaningful and exciting. Regarding the second dimension, there is a considerable variance of answers: some researchers have reservations about the institutional circumstances at their institutions, others are satisfied. However, the third dimension proved to be severely problematic for many of the respondents.

Salaries are out of the focus of the international academic career research, not being considered a measure of career success (Glaser, J., Laudel G. 2015). On the contrary, in the case of Hungary, wage proved to be important in the respondents' career decisions and actual labour market behaviour. It is rooted in the characteristics of the Hungarian public servant pay scale, which is unfavourable for young researchers at the beginning of their career and does not differentiate performance. Because of this structural circumstance the satisfaction with wage usually lags behind the two above mentioned dimensions. Thus, causing inconsistencies in the overall satisfaction with their academic statuses among young Hungarian scholars, which could result in severe frustration.

Findings show that young and postdoctoral researchers are eager to harmonise these dimensions. Namely to improve their financial circumstances in order to align their

possibilities and their expectations which are based on their high qualification and motivational level. In different scientific fields they have different strategies for harmonising these factors, eliminating the inconsistency and getting over the frustration. Their *beliefs, attitudes, intentions* and their *actual behaviour* in the labour market show distinct strategies.

SSH Strategies

SSH careers are '*boundaryless'* (Arthur and Rousseau 1996) in the meaning that SSH scholars are moving across the boundaries of different sectors, organisations and topics. The organisational sequences of the examined career-path stories draw out project-oriented '*multidirectional*' careers (Baruch 2004) which are preferably based on a fixed academic position. SSH researchers do not avoid the business and enterprise sector. In their case the routine is to have complementary part-time jobs, consultative statuses, basic or applied research projects, both in the business enterprise and the government sector besides their academic statuses.

Optimally, these projects connect to their own academic research topic. In this case these could improve their academic expertise and even their scientific performance directly. However, in many cases researchers have to work on many separate topics at the same time. Therefore, it results in a fragmented career span.

This strategy raises many questions: Are these complementary jobs pointing towards the mentioned science policy goals? Can we call this knowledge–transfer? Could the business sector profit from these co-operations? Could these researchers push a professional advantage or do they simply miss some opportunities in their academic performance because of this strategy? A follow-up study should examine both the positive and negative effects on academic productivity of this fragmented career path structure and the impacts on innovation of the business enterprise sector.

STEM Strategies

STEM researchers usually don't have complementary part time jobs or other "industrial" projects besides their academic positions, as it simply does not fit into their schedule. They have more '*linear*' career paths (Baruch 2004). Effectively, their narratives show it is so because they must concentrate on their narrow field of research in order to keep up with their peers.

Nonetheless, they react to the mentioned inconsistency too. They have two main strategies: one is to apply for research grants in their field of interest which is a natural and useful part of their career-path. Yet the other one is dangerous, as it is to apply for a post-doctoral or even tenure status *abroad*.

The most important finding is that Hungarian STEM scholars prefer foreign academic positions to business and enterprises researcher jobs in Hungary. Both qualitative and quantitative results about their *intentions* and their labour market *behaviour* underpin that most of the STEM researchers would leave the country instead of changing sectors inside Hungary.

In the background of this phenomenon we have found different factors. The negative *beliefs, and attitudes* towards the business enterprise sector were one. By the results of the qualitative data, the *attitudes*, and *beliefs* of young STEM researchers formed the negative stereotype. What is more, they fear that changing from the academic to the business sector means the end of their scientific career because of the limited publishing possibilities. They choose the opportunities which could keep them in their scientific career path without breaking its span – this is exactly what they are optimising for.

Another important background factor emerging from the career narratives is that the reference group regarding wage for these internationally mobile young scientists is usually the international or the EU15 scholars' community, and its attainable standard of living. They compare their financial possibilities to the Western European counterparts.

All these factors regarding the background of the career decisions of the examined scholars are also important as underlying causes of the high level of brain drain among STEM researchers in Hungary. According to a calculation (Csanády-Személyi 2006), one in every four fresh graduates with a diploma in science leaves the country. This same rate for PhD holders is even higher (Csanády-Kmetty-Kucsera-Személyi-Tarján 2008).

The main question is, under which circumstances would they be willing to come back, or stay? Under what structural circumstances can they better harmonise the mentioned factors in order to gain satisfaction at their academic positions in Hungary? Could the business enterprise sector in Hungary offer any remedy for this brain-drain problem?

Further research should focus on this, and the role that higher education has in the formation of attitudes of PhD holders towards business sector positions. By providing more information and direct experience, especially in STEM fields, higher education may turn the business and enterprise sector into something more familiar for the most creative minds.

6 Conclusions

Our research found distinctive differences between SSH and STEM scholars' career path strategies based partly on their different *beliefs, attitudes*, and *intentions* towards the business sector and their labour market *behaviour*. Among the factors behind these strategies we have recognized a common structural determinant: the importance of the characteristics of the public servant salary system.

Further research should systematically measure the attitudes of scholars, the structural determinants and their importance on career decisions. Other relevant research directions are: measuring attitudes towards the business sector among PhD holders in particular types of collaboration (e.g. forms of technology–transfer, strategic partnerships and other sectorial collaborations), examining the influence of professional identity formation on the attitudes of PhD holders towards business sector collaborations, and the influence of values in higher education on their professional identity.

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